DETERMINING CONCENTRATION OF CALCIUM CHLORIDE SOLUTIONS BY HYDROMETER

SCOPE

This method is intended for determining the concentration of calcium chloride solutions used with pavement repair work.

PROCEDURE

A. Apparatus

1. Hydrometer, calibrated at 77°F (25°C) in increments of percent calcium chloride.

2. Thermometer capable of reading liquid temperatures from 40°F to 150°F within 5°F (5°C to 65°C within 3°C).

B. Test Procedure

1. Lower the hydrometer gently into the solution and allow to float freely.

2. Depress the hydrometer about two scale divisions into the liquid, and then release it. Allow sufficient time for the hydrometer to come to rest, and for all air bubbles to come to the surface.

3. When the hydrometer has come to rest, floating freely away from the walls of the container, estimate the hydrometer scale reading to the nearest 0.5 percent calcium chloride. The correct reading is that point on the hydrometer scale at which the liquid surface cuts the scale.

4. Immediately determine the temperature of the test solution to the nearest 5°F (3°C). Correct the hydrometer reading to 77°F (25°C) using Table 1 or Table 2.

TABLE 1
PERCENT CALCIUM CHLORIDE CORRECTED TO 77°F

Hydrometer Reading at Test Temp.	TEST TEMPERATURE, in °F						
%	40	60	80	100	120	140	160
31.0	30.0	30.6	31.1	31.6	32.1	32.8	33.60
31.5	30.5	31.1	31.6	32.1	32.6	33.3	34.1
32.0	31.0	31.6	32.1	32.6	33.2	33.8	34.5
32.5	31.5	32.1	32.6	33.1	33.7	34.3	34.9
33.0	32.0	32.6	33.1	33.6	34.2	34.8	35.4
33.5	32.5	33.0	33.5	34.1	34.8	35.4	36.0
34.0	32.9	33.6	34.1	34.7	35.3	35.9	36.5
34.5	33.4	34.1	34.6	35.1	35.7	36.3	36.9
35.0	34.0	34.6	35.1	35.6	36.2	36.8	37.4
35.5	34.5	35.1	35.6	36.2	36.8	37.4	38.0
36.0	35.0	35.6	36.1	36.7	37.3	37.8	38.4
36.5	35.5	36.1	36.6	37.2	37.8	38.4	39.0
37.0	36.0	36.6	37.1	37.7	38.3	38.9	39.5
37.5	36.4	37.0	37.6	38.2	38.9	39.4	40.0
38.0	36.9	37.5	38.1	38.8	39.4	40.0	----
38.5	37.4	38.0	38.6	39.3	39.9	----	----
39.0	37.9	38.5	39.1	39.7	----	----	----
39.5	38.4	39.0	39.5	----	----	----	----
40.0	38.9	39.4	40.0	----	----	----	----

TABLE 2
PERCENT CALCIUM CHLORIDE CORRECTED TO 25°C

Hydrometer Reading at Test Temp.	TEST TEMPERATURE, in °C						
%	5	15	25	35	45	55	65
31.0	30.0	30.6	31.0	31.5	31.9	32.4	33.1
31.5	30.5	31.0	31.5	32.0	32.4	33.0	33.7
32.0	31.0	31.6	32.0	32.5	33.0	33.5	34.1
32.5	31.5	32.1	32.5	33.0	33.5	34.0	34.6
33.0	32.0	32.6	33.0	33.5	34.0	34.5	35.1
33.5	32.5	33.0	33.5	33.9	34.6	35.1	35.7
34.0	32.9	33.6	34.0	34.6	35.1	35.6	36.2
34.5	33.4	34.1	34.5	35.0	35.5	36.0	36.6
35.0	34.0	34.6	35.0	35.5	36.0	36.5	37.1
35.5	34.5	35.1	35.5	36.0	36.6	37.1	37.7
36.0	35.0	35.6	36.0	36.6	37.1	37.6	38.1
36.5	35.5	36.1	36.5	37.0	37.6	38.1	38.7
37.0	36.0	36.6	37.0	37.5	38.1	38.6	39.2
37.5	36.4	37.0	37.5	38.0	38.6	39.2	39.7
38.0	36.9	37.5	38.0	38.6	39.2	39.7	----
38.5	37.4	38.0	38.5	39.1	39.7	----	----
39.0	37.9	38.5	39.0	39.5	40.0	----	----
39.5	38.4	39.0	39.5	40.0	----	----	----
40.0	38.9	39.4	40.0	----	----	----	----

Examples of Table Use

1. Percent calcium chloride indicated by hydrometer is 37.0% at a test temperature of 120°F. Find the 37% line in the left column and read 38.3% in that line under the 120°F test temperature column.

2. Percent calcium chloride indicated by hydrometer is 37.5% at a test temperature of 105°F. Find corrected result of 38.2% for 100°F and 38.9% for 120°F. Estimate the corrected value for 105°F to be about 38.4%.